



Patuxent Science Meeting 2004 Poster Abstract

Effects of mercury in fledgling and adult cormorants and egrets along the Carson River, Nevada

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High concentrations of mercury (Hg) from historical mining activities have accumulated in the food chain of fish-eating birds nesting along the mid to lower Carson River. Activities of ten plasma and tissue enzymes and other biochemistries were measured for double-crested cormorant, *Phalacrocorax auritus* (DCC) and snowy egret, *Egretta thula* (SE) fledglings and adults from a high mercury site (LCRS) and a low mercury reference site. Geometric mean blood Hg concentrations at the LCRS site were 5.4 and 17.1 ppm (ww) for fledgling and adult DCC, and 2.7 and 5.9 for SE. Compared to adult birds, fledglings had 2 to 3 times as many biochemical variables that were significantly linked to Hg. Mercury-related oxidative stress in DCC included 3-fold increases in hepatic thiobarbituric acid reactive substances (TBARS) indicative of lipid peroxidation. In young DCC, Hg decreased hepatic reduced glutathione (GSH) concentration and GSH-S-transferase activity, but increased the ratio of oxidized glutathione (GSSG) to GSH and selenium-dependent GSH peroxidase activity. In adult DCC, hepatic G-6-PDH activity decreased with increasing Hg. Young DCC from the LCRS exhibited 2-fold elevations in activities of five plasma enzymes (GSSG-reductase, ALT, AST, ChE, and LDH-L) linked to mercury-induced hepatotoxicity in birds. Oxidative stress was also apparent in DCC brain and kidney. In fledgling SE with lower concentrations of mercury than DCC, oxidative stress was less, and evidence of compensatory mechanisms were apparent. These included increased activities of hepatic G-6-PDH and GSH-S-transferase activities in LCRS birds. Responses to mercury in fish-eating birds appear to be dependent upon dietary exposure, species, and age. (This study was funded in part by the U. S. EPA)